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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/810,474	03/19/2001	Motoyasu Terao	ASA-991	8982

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EXAMINER

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ART UNIT PAPER NUMBER

1756

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/810,474

Applicant(s)

TERAO ET AL.

Examiner

Martin J Angebrannt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20 is/are allowed.
- 6) ☒ Claim(s) 1-19, 21 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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1. Claims 11 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Al is atomic number 13.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2,6,7,10,11,16 and 21 are rejected under 35 U.S.C. 102(e) as being fully anticipated by Zhou '573.

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Examples 2 and 3 have a structure shown in figure 1 and described at 6/12-37. In example 2, the layer 6 is 55 nm of Ge and the reflective layer (8) is 100 nm aluminum. In example 3, the layer 6 is 35 nm of Mo and the reflective layer (8) is 100 nm aluminum. The dielectric between the recording layer and layer 8 is 5 nm and the dielectric layer (7) between the layers (6) and (8) is 20 nm. The thickness of the lower dielectric layer may be between 70 and 280 nm (4/40-49). The reflective layer may be metals such as Al, Ti, Au, Ni, Cu, Ag, Rh, Pt, Pd, Ni, Co, Mn, Cr and alloys of these. (4/36-39). Useful materials for the light absorbing layer include Mo, W, Pd, Pt, Co, Ni, Mn, Ta, Cr, Ti and Hf and may have thicknesses of between 2 and 200 nm depending upon absorption (3/15-33). Useful pitches are between 0.6 and 1.2 microns, with decreasing pitch increasing the possible data density (5/47-57 and 1/39-60).

5. Claims 2,3,5-11,16-18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou '573.

It would have been obvious to use other disclosed materials, such as Ti, Cr, Mn, Co or Ni, in place of the Mo layer in example 3 based upon the disclosure of equivalence and/or it would have been obvious to use other disclosed materials, such as Ti, Cr, Cu, Mn, Pd, Co, Ag or Ni, in place of the Al reflective layer in example 3 based upon the disclosure of equivalence and/or it would have been obvious to use substrate with other pitches, such as 0.6 microns to increase the data density.

6. Claims 2-5,7-10,16 and 21 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Hirota et al. JP 05325261.

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In section [0061] (JAPIO machine translation attached) describes a 360 nm dielectric layer, a 25 nm phase change recording layer, a 20 nm upper dielectric layer, a 15 nm $\text{Ti}_{95}\text{Al}_5$ thermal expansion relief layer, a 130 nm $\text{Pd}_{0.001}\text{Hf}_{0.01}\text{Al}_{0.99}$ reflection layer, and a 40 nm $\text{Ti}_{95}\text{Al}_5$ strengthening layer. In section [0066] the uppermost layer is replaced with 40 nm of Ti. The thermal expansion relief layer may be Ti, Zr, Hf, Ta, Nb, Rh, and W and may be alloyed with V, Sn, Cr, Au, Ag, or Cu in amounts of less than 20 % [0023]. The thickness of the thermal expansion relief layer may be 10-30 nm [0026]. The reflection layer may be Au, Ag, Cu, etc., and alloys thereof with a thickness of 30-300 nm [0027-0029]. The strengthening layer may be Ti, Zr, Hf, Ta, Nb, Rh, W or alloys thereof in thicknesses of 20-100 nm [0031-0033]. The recording layer thickness may be 10-30 nm. [0044].

7. Claims 2-5, 7-13, 15-18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirota et al. JP 05325261.

It would have been obvious to use other disclosed materials or thicknesses, such as Ti, Zr, or Nb and 30 nm, in place of the 15 nm $\text{Ti}_{95}\text{Al}_5$ thermal expansion relief layer in the example based upon the disclosure of equivalence and/or it would have been obvious to use other disclosed materials, such as Ag or Cu, in place of the $\text{Pd}_{0.001}\text{Hf}_{0.01}\text{Al}_{0.99}$ reflection layer in the example based upon the disclosure of equivalence and/or it would have been obvious to use other disclosed materials or thicknesses, such as Ti, Zr, or Nb and 50-100 nm, in place of the 40 nm $\text{Ti}_{95}\text{Al}_5$ strengthening layer in the example based upon the disclosure of equivalence and/or it would have been obvious to use other disclosed recording layer thicknesses based upon the disclosure at [0044].

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8. Claims 2,3,5,7,9,11,16, and 21 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Okada JP 05-159360.

The example uses a 140 nm lower dielectric layer, a 20 nm phase change recording film, a 220 nm upper dielectric, a 50 nm Ti absorption layer and a 50 nm Al reflection/radiating layer. (page 11 of translation, [0011]) The absorption layer may use Ti, Ni, W, Mo, V, Nb, Cr, or Fe and the reflective layer may be Al, Cu, Au, or Ag. ([0009], pages 9 and 10 of the translation)

9. Claims 2,3,5-9,11,16,18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada JP 05-159360.

It would have been obvious to use other disclosed materials, such as Ni, Mo, V, CR, Fe, or Nb, in place of the Ti layer in the example based upon the disclosure of equivalence and/or it would have been obvious to use other disclosed materials, such as Ag or Cu, in place of the Al reflection layer in the example based upon the disclosure of equivalence

10. Claims 2,3,5-7,9-11,16, and 21 are rejected under 35 U.S.C. 102(e) as being fully anticipated by Obayashi et al. '039.

Example 5 has a 260 nm dielectric layer, a 35 nm recording layer, a 10 nm upper dielectric layer, a 40 nm Nb layer and a 90 nm Al alloy reflective layer. Example 6 has a 240 nm dielectric layer, a 30 nm recording layer, a 5 nm upper dielectric layer, a 50 nm Nb layer and a 30 nm Al alloy reflective layer. Example 10 has a 220 nm dielectric layer, a 20 nm recording layer, a 10 nm upper dielectric layer, a 40 nm Mo layer and a 90 nm Al alloy reflective layer. Examples 18,19,21,26,28,29 and 38 also use metals or alloys meeting the limitation of the claims in the light absorbing layer. Useful reflective layer materials including Al, Ag, Au, Cu and alloys with other materials (8/34-62). Useful absorbing layer materials which are useful in thicknesses

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of 25-200 nm include Ti, Zr, Hf, Cr, Ta, Mo, Mn, W, Nb, Rh, Ni, Fe, Pt, Os, Co, Zn, and Pd

(5/10-6/18).

11. Claims 2,3,5-9,11,16,18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Obayashi et al. '039.

It would have been obvious to use other disclosed materials, such as Mn, Co, Ni, Cr, in place of the Nb, Ti or Mo layer in the example based upon the disclosure of equivalence and/or it would have been obvious to use other disclosed materials, such as Ag or Cu, in place of the Al reflection layer in the example based upon the disclosure of equivalence

12. Claims 2,3,5-11,16,18 and 21 are rejected under 35 U.S.C. 102(e) as being fully anticipated by Ohno et al. '166.

See examples 4,8,9,12 and 14 and comparative examples 6-8, which use 40 nm thick Ni, Co, Cr, V, Pd, Ti, Zr and Ge layers directly below Ag reflective layers. The silver layers may be 30-300 nm thick (23/25). The intermediate layer may be of various materials and may be 50 nm thick. (21/24-33)

13. Claims 21 and 22 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Sekiya et al. EP 0359114.

See examples 13-17 and 24=25 in table 1 on page 4.

14. Claims 1,19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terao et al. '986.

Example 1 coats a 20 nm thick Ti island film having columnar structure as shown in figure 2. The thickness of these layers may be preferably 10-450 nm (6/49/7-3). The materials

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disclosed as recited in column 11 and include Cr, Ti, V, MN, Fe, Co, Ni, Cu, Zn, Zr, Nb and Mo.

It would have been obvious to one skilled in the art to modify the invention of example 1 by using other thicknesses up to 450 nm based upon the disclosure of equivalence as well as to use other metals as disclosed with a reasonable expectation of achieving comparable results.

15. Claims 19 and 21 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Werner et al. '332.

See examples 1 and 4 using silver to form a porous film. The examiner notes that the cooling of vaporized metal through impact with inert gas is disclosed (5/38-47)

16. Claims 2-4,7-13,16-18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto et al. '932.

Miyamoto et al. '932 teach phase change optical recording media which have two or three reflective layers as shown in figures 3-5. The closest of these to the recording layer must have more than 60% Al, Ag, Au, Pt or Pd. The second layer must have a larger percentage of these. (2/3-10) The third layer must have a larger percentage of these. (13/32-43) It is preferred that the first layer contains 70-85% of these metals.

It would have been obvious to one skilled in the art to use alloys of Cu, Pd or Ag, rather than the Al alloys of the examples with a reasonable expectation of achieving comparable results.

17. Claims 2-4,7-18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto et al. '932, in view of Obayashi et al. '039

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It would have been obvious to add absorption compensation layer as taught by Obayashi et al. '039 to the phase change recording media of Miyamoto et al. '932 with a reasonable expectation of gaining the advantages ascribed to the absorption layer.

18. Claim 20 is allowable over the prior art of record. There is a teaching that the cooling of the particles which results in a coarser film maybe achieved using impact with inert gas atoms as a cooling mechanism. This provides motivation to increase the pressure, but not to increase the flow rate of argon

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lee et al. '326 disclose relevant examples in table 1.

Hirotsune et al. '104 is cumulative to the applied references see figures 1b

Kosuda et al. '330 teach argon flow rates of 100 sccm when forming Al reflective layers.

JP 04-05837 and JP 2000-293893 are cumulative to the applied references.

20 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebrannndt whose telephone number is 703-308-4397. The examiner can normally be reached on Available Mondays-Thursday and alternative Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Martin J Angebranndt
Primary Examiner
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February 10, 2003